IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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First Named Inventor	:	Jochen SANG			
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TC/A.U.	:	1732			
Examiner	:	Bijay S. Saha			
Docket No.	:	102063.56904US			
Title	:	Fuel Cell System with Variable Coanda Amplifiers for Gas Recirculation and System Pressure Regulation			

APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellants submit the following:

I. REAL PARTY IN INTEREST

The real party in interest is NuCellSys GmbH, Neue Strasse 95, 73230 Kirchheim/Teck-Nabern, Germany, as noted in an Assignment from the inventors to NuCellSys GmbH recorded in the U.S. Patent and Trademark Office on June 29, 2007 at Reel/Frame 019499/0226.

II. RELATED APPEALS AND INTERFERENCES

Appellants are not aware of any appeals, interferences, or other proceedings which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-21 are pending. Claims 1-12 and 21 stand rejected and are subject to this appeal. Claims 13-20 have been withdrawn and are not subject to this appeal.

IV. STATUS OF AMENDMENTS

Appellants have not submitted any amendments subsequent to the Final Office Action dated July 6, 2011 (hereinafter "the Final Office Action").

V. SUMMARY OF CLAIMED SUBJECT MATTER

Appellants' invention relates to a Coanda flow amplifier. The operation of the Coanda flow amplifier is based on the Coanda effect, in which a fluid flowing along a curved surface tends to follow the outline of the curved surface (¶ [0003]). For example, as shown in Fig. 1, the Coanda flow amplifier 10 includes a drive-flow inlet 60 for a fluid flow to be amplified, a fluid channel 42, and a fluid outlet 24 (¶¶ [0003], [0040], [0043], and [0044]). The fluid channel 42 is bordered by a curved surface 52, and at first narrows along the flow direction F of the fluid flow to be amplified, and then widens to form a funnel shape (Fig. 1; ¶ [0003]). A drive-flow discharge slit 66 connects the drive-flow inlet 60 with the fluid channel 42 in a fluid-conducting manner (Fig. 1; ¶¶ [0003] and [0045]).

The drive-flow inlet 60 supplies the Coanda flow amplifier 10 with drive fluid that reaches a very high flow velocity when passing through the drive-flow discharge slit 66, and then flows through the fluid channel 42 along the curved surface 52 (¶¶ [0004] and [0050]). This generates suction in the area of the suction intake 22, causing large volumes of fluid to be sucked into the suction intake 22 (¶¶ [0004], [0040], and [0050]).

For proper operation, the drive fluid must be accelerated to a very high flow velocity, typically the velocity of sound, when passing through the drive-flow discharge slit 66 (¶ [0007]). This can be achieved if a pressure ratio between the discharge pressure of the drive flow when it leaves the drive-flow discharge slit 66 and an intake pressure of the drive flow when it enters the drive-flow

discharge slit 66 does not exceed a critical pressure ratio (¶ [0007]). For example, to accelerate the drive fluid to sonic velocity (Mach 1), the critical pressure ratio may be 0.528 for diatomic gases (¶ [0007]). To prevent this critical pressure ratio from being exceeded, prior art devices typically attempt to supply the drive fluid to the Coanda flow amplifier at a sufficiently high supply pressure that is pre-set by a pressure controller (¶ [0007]).

However, the mass flow and/or the supply pressure of the drive fluid may be affected by other system parameters during operation of the Coanda flow amplifier (¶¶ [0008] and [0024]). For example, the Coanda flow amplifier may be used in a fuel cell system to recirculate the anode exhaust gas (¶ [0008]). If the fuel gas to be supplied to the anode side of the fuel cell is used as the drive fluid, then the fuel gas volume to be supplied to the fuel cell depends on the fuel gas consumption in the fuel cell (i.e. the load of the fuel cell) (¶ [0008]). Therefore, under low-load conditions of the fuel cell, the pre-set intake pressure of the drive fluid may not be sufficient to accelerate the drive-fluid flow to a high enough velocity when it passes through the drive-flow discharge slit 66 of the Coanda flow amplifier (¶ [0008]). Accordingly, an object of the invention is to ensure the proper functioning of the Coanda flow amplifier, even if the mass flow rate and/or the supply pressure of the drive fluid passing through the drive-flow discharge slit 66 is variable (¶¶ [0009] and [0024]).

An exemplary embodiment of Appellants' invention achieves this and other objects by providing an electronic control unit that adjusts the flow cross

section of the drive-flow discharge slit 66 after the Coanda flow amplifier has been assembled (¶¶ [0010] and [0047]-[0049]). For example, the cross-sectional area of the drive-flow discharge 66 may be selected based on the supply pressure of the drive flow (¶¶ [0010]). Specifically, the cross-sectional area of the drive-flow discharge 66 may be selected such that the pressure ratio between the output pressure of the drive flow that leaves the drive-flow discharge slit 66 and the intake pressure of the drive flow that enters the drive-flow discharge slit 66 does not exceed the critical pressure ratio (¶¶ [0010]). This eliminates the need to use a separate pressure controller to pre-set the supply pressure of the drive fluid (¶¶ [0010]).

Turning to the claim language, independent claim 1 is directed to a Coanda flow amplifier (¶ [0040]; Fig. 1). The Coanda flow amplifier comprises "a suction intake; an outlet; a fluid channel extending between the suction intake and the outlet; [and] a drive flow inlet that is in fluid flow communication with the fluid channel via a drive-flow discharge slit" (¶¶ [0040] and [0043]-[0045]; Figs. 1 and 2). The Coanda flow amplifier also comprises "an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio" ((¶¶ [0047]-[0049]; Figs. 1 and 2).

The foregoing discussion, which includes many specifics in relation to a concrete embodiment, is not intended to limit the claims. The claims are intended to be broadly construed.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are:

(a) whether claims 1 and 2 were properly rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over EP 0 456 931 to Horii et al. (hereinafter "Horii");

(b) whether claims 1 and 2 were properly rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Horii in view of U.S. Patent No. 6,524,076 to Konishi;

(c) whether claims 2 and 21 were properly rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Horii and Konishi in view of U.S. Patent No. 2,856,234 to McNair et al. (hereinafter "McNair");

(d) whether claims 3-5 and 10-12 were properly rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Horii and Konishi in view of U.S. Patent No. 6,739,574 to Simon; and

(e) whether claims 6-9 were properly rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Horii, Konishi, and Simon in view of U.S. Patent No. 5,433,365 to Davies.

VII. ARGUMENT

A. Claims 1 and 2 are Not Obvious over Horii under 35 U.S.C. § 103(a)

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Horii. However, for the following reasons, Appellants submit that the rejection is improper and should be withdrawn.

Claim 1

Independent claim 1 recites a Coanda flow amplifier that comprises, *inter alia*, "an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio." Appellants respectfully submit that Horii fails to teach or suggest the quoted claim features.

Horii discloses a Coanda spiral flow device. As shown in Fig. 2 of Horii, the Coanda spiral flow device includes a first unit A, a second unit B, and an outer peripheral tube unit C that partially covers the first unit A and the second unit B and couples them together (page 2, right column, lines 34-39).[1] The first unit A has an introducing port 1, and the second unit B has a discharge outlet 4 (page 2, right column, lines 40-45). The outer peripheral tube unit C covers an annular groove 8 in the second unit B to form a ventilation distribution chamber 10 that communicates with a compressed gas inlet port 11 (page 3, left column,

lines 18-22). The Coanda spiral flow device has a Coanda slit 5 through which compressed gas is fed (page 3, left column, lines 26-29).

According to Horii, it was previously difficult to control the slit clearance of the Coanda slit 5 to an accuracy on the order of 0.01 mm during an assembly operation at a job site (page 2, left column, lines 43-50). Therefore, a purpose of Horii is to design the Coanda spiral flow unit such that the assembled Coanda spiral flow unit has a particular slit clearance with a high precision (page 2, left column, lines 51-55; page 3, left column, lines 11-14). Specifically, the first unit A, the second unit B, and the outer peripheral tube unit C are designed in advance to form a Coanda spiral flow unit with a Coanda slit 5 having a specified slit clearance with a high precision (page 3, left column, lines 11-13 and 31-34). For example, the first unit A, the second unit B, and the outer peripheral tube unit C may be designed such that the Coanda slit 5 has a clearance of 0.18 mm once the Coanda spiral flow unit is assembled (page 3, right column, lines 5-13).

The first unit A, the second unit B, and the outer peripheral tube unit C of Horii are connected by threaded fastenings at coupling flanges 3 and 9 (page 3, left column, lines 23-26). The clearance of the Coanda slit 5 is set by manually adjusting the threaded fastenings during assembly of the Coanda spiral flow device (page 3, left column, lines 26-29). For example, Fig. 1 of Horii appears to show that the clearance of the Coanda slit 5 is set during assembly by physically turning the screws near the coupling flanges 3 and 9.

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[1] Appellants note that all citations to Horii are made to EP 0 456 931 A1.

Based on the above description, it is clear that Horii does not teach or suggest an "electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier," as recited in claim 1 (emphasis added). Instead, Horii manually adjusts the clearance of the Coanda slit 5 during assembly of the Coanda spiral flow unit by physically turning the screws near the coupling flanges 3 and 9.

The Final Office Action acknowledges that Horii does not disclose an electronic control unit (Final Office Action, page 13). However, the Final Office Action states that "the electronic control is functionally equivalent to the manual control of the flow," and cites MPEP § 2144.04(III), which states that "broadly providing an automatic or mechanical means to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art." The Final Office Action concludes that "Horii anticipates the claim limitation" (Final Office Action, page 4). Appellants respectfully disagree.

Preliminarily, Appellants note that Horii cannot anticipate the electronic control unit recited in claim 1, because Horii manually adjusts the clearance of the Coanda slit 5. As discussed in MPEP § 2131, in order to establish a *prima facie* case of anticipation, the Office Action must show that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Because the Final Office Action acknowledges that Horii manually adjusts the clearance of the Coanda slit 5

instead of providing an electronic control unit, Horii cannot anticipate the recited electronic control unit.

Further, the Final Office Action does not explain why it would have obvious to modify Horii by providing an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier. Appellants recognize that MPEP § 2144.04 provides examples of legal precedent that may be used to support an obviousness rejection, provided that the facts of the case are sufficiently similar to those in the application under examination. For example, MPEP § 2144.04(III) states that "broadly providing an automatic or mechanical means to replace a manual activity which accomplished the <u>same result</u> is not sufficient to distinguish over the prior art" (emphasis added). However, Appellants respectfully submit that the recited electronic control unit does not provide the same result as the manual adjustment of the clearance of the Coanda slit 5 in Horii.

The recited electronic control unit adjusts the flow cross section of the drive-flow discharge slit <u>after assembly</u> of the Coanda flow amplifier, while the manual adjustment of the clearance of the Coanda slit 5 is performed <u>during assembly</u> of the Coanda spiral flow unit in Horii. Further, the recited electronic control unit adjusts the flow cross section of the drive-flow discharge slit "such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio." This allows

the recited electronic control unit to ensure the proper functioning of the Coanda flow amplifier, even if the mass flow rate and/or the supply pressure of the drive fluid passing through the drive-flow discharge slit is variable during operation. Horii cannot provide this result, because the clearance of the Coanda slit 5 is manually set during assembly and before beginning operation of the Coanda spiral flow unit.

In addition, Horii teaches away from adjusting the clearance of the Coanda slit 5 after assembly of the Coanda spiral flow unit. As discussed above, the first unit A, the second unit B, and the outer peripheral tube unit C of the Coanda spiral flow unit are designed such that the Coanda slit 5 has a specific slit clearance with a high precision once the Coanda spiral flow unit is assembled (page 3, left column, lines 11-14 and 31-34). In order to change the slit clearance, it would be necessary to redesign the components of the Coanda spiral flow unit, and then reassemble the Coanda spiral flow unit to have the new slit clearance. Instead, the Coanda spiral flow unit of Horii is designed to maintain the specific clearance of the Coanda slit 5 after assembly.

In response, the Final Office Action cites claim 1 of Horii and states that claim 1 does not disclose that the clearance of the Coanda slit 5 is set during assembly (Final Office Action, page 14). However, the passages described above clearly indicate that the clearance of the Coanda slit 5 is set during assembly. MPEP § 2141.02(VI) states that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the

claimed invention" (emphasis in original). Therefore, even assuming *arguendo* that one of the claims of Horii does not clearly indicate that the clearance of the Coanda slit 5 is set during assembly, the portions of the specification discussed above that teach away from this feature must be considered in evaluating the patentability of the claimed invention.

Further, the Final Office Action cites page 3, left column, lines 22-40 of Horii as allegedly showing that Horii does not teach away from adjusting the clearance of the Coanda slit 5 after assembly of the Coanda spiral flow unit (Final Office Action, pages 13-14). This passage states the following:

> The interconnection of the first unit A, the second unit B and the outer peripheral tube unit C can be easily effected by threaded fastenings at the coupling flanges 3 and 9. By adjustment of the threaded fastenings, the clearance of the coanda slit 5 through which compressed gas is fed can be set to a specified gap. The outer peripheral tube unit C is removable from the first and second units A and B. Various kinds of first unit A, second unit B and outer peripheral tube unit C, which are designed in advance to form the specified coanda slit 5, may be envisaged. This eliminates the difficulty which is inherent if the coanda slit 5 is adjusted during assembly as in the case of a conventional coanda spiral unit, and thus permits the occasional assembly of the units at a job site, thereby remarkably improving convenience, and process accuracy and efficiency.

As discussed above, this passage explains that the first unit A, the second unit B, and the outer peripheral tube unit C of the Coanda spiral flow unit of Horii are designed <u>in advance</u> to form a Coanda spiral flow unit with a Coanda slit 5 having a specified slit clearance with a high precision. This passage also indicates that the clearance of the Coanda slit 5 is set <u>during assembly</u> by

adjusting the threaded fastenings. The reference to eliminating the difficulty if the Coanda slit 5 is adjusted during assembly simply points out that Horii determines the desired clearance in advance and designs the components of the Coanda spiral flow unit accordingly, instead of allowing for different clearances during assembly.

Further, Horii does not teach or suggest that the clearance of the Coanda slit 5 is adjusted "such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio," as recited in claim 1. In rejecting claim 1, the Final Office Action cites MPEP § 2114 and states that claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. The Final Office Action also states that the "functionality of the slit whether operated manually or electronically is to maintain the required pressure ratio" (Final Office Action, page 5). Although the Final Office Action acknowledges that functional limitations must be evaluated and considered, the Final Office Action states that "consideration and evaluation of a functional limitation does not necessarily make a functional limitation a claim limitation" (Final Office Action, page 15). The Final Office Action then states that the structural limitation is the electronic control unit, whose function is to control the flow.

Appellants respectfully submit that the recited pressure ratio further defines the structure of the Coanda flow amplifier, because it affects the flow

cross section of the drive-flow discharge slit. Further, Horii does not disclose adjusting the clearance of the Coanda slit 5 such that the recited critical pressure ratio is not exceeded. On the contrary, Horii discloses that the clearance of the Coanda slit 5 is chosen to achieve the desired spiral flow (page 2, left column, lines 45-48). Therefore, claim 1 is patentable over Horii for at least the reasons discussed above, as well as its additionally recited features.

<u>Claim 2</u>

Claim 2 is patentable over Horii at least by virtue of its dependence on claim 1, as well as its additionally recited features. Claim 2 recites that "the drive-flow discharge slit can be completely closed." In rejecting claim 2, the Final Office Action states the following:

> Regarding claim 2, Horii further discloses adjustments of the threads via the coupling flanges (part # 3 and #9 Fig 2) the clearance of slit (part #5) is adjusted (col 3 lines 25-30). Consistent with the Horii teaching, at the time of invention it would have been obvious to a person of ordinary skill in the art that the slits are adjustable slits; hence, capable of adjustment of flow cross section and maintain the pressure requirements. Hence, prior art anticipates the claim limitation.

Final Office Action, page 5. This section of the Final Office Action only asserts that the clearance of the Coanda slit 5 of Horii is adjustable, and does not explain whether Horii discloses that the Coanda slit 5 of Horii can be completely closed. As discussed above, Horii states that the clearance of the Coanda slit 5 is chosen to achieve the desired spiral flow. Further, once the Coanda spiral flow unit of Horii has been assembled, the clearance of the Coanda slit 5 is no longer

adjusted. Therefore, the Coanda slit 5 of Horii cannot be completely closed, because this would prevent the Coanda spiral flow unit from achieving the desired spiral flow. Appellants note that a different section of the Final Office Action appears to acknowledge that Horii does not teach or suggest that the Coanda slit 5 can be completely closed (Final Office Action, page 8).

B. Claims 1 and 2 are Not Obvious over Horii and Konishi under 35 U.S.C. § 103(a)

Claims 1 and 2 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Horii and Konishi. However, for the following reasons, Appellants submit that the rejection is improper and should be withdrawn.

<u>Claim 1</u>

As discussed above, Horii does not teach or suggest a Coanda flow amplifier that comprises, *inter alia*, "an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio," as recited in claim 1. On the contrary, as discussed above, Horii teaches away from the quoted claim feature. Further, Konishi fails to remedy the deficient teachings of Horii. Therefore, claim 1 is patentable over Horii and Konishi for at least the reasons discussed above, as well as its additionally recited features.

Claim 2

As discussed above, Horii does not teach or suggest that "the drive-flow discharge slit can be completely closed," as recited in claim 2. On the contrary, as discussed above, Horii teaches away from the quoted claim feature. Further, Konishi fails to remedy the deficient teachings of Horii. Therefore, claim 2 is patentable over Horii and Konishi for at least the reasons discussed above, as well as its additionally recited features. Appellants note that a different section of the Final Office Action appears to acknowledge that the alleged combination of Horii and Konishi does not teach or suggest that the drive-flow discharge slit can be completely closed (Final Office Action, page 8).

C. Claims 2 and 21 are Not Obvious over Horii, Konishi, and McNair under 35 U.S.C. § 103(a)

Claims 2 and 21 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Horii, Konishi, and McNair. However, for the following reasons, Appellants submit that the rejection is improper and should be withdrawn.

Claim 2

As discussed above, Horii does not teach or suggest that "the drive-flow discharge slit can be completely closed," as recited in claim 2. On the contrary, as discussed above, Horii teaches away from the quoted claim feature. Further, Konishi and McNair fail to remedy the deficient teachings of Horii. Therefore, claim 2 is patentable over Horii, Konishi, and McNair for at least the reasons discussed above, as well as its additionally recited features.

In this section, the Final Office Action appears to acknowledge that the alleged combination of Horii and Konishi does not teach or suggest that the drive-flow discharge slit can be completely closed (Final Office Action, page 8). However, the Final Office Action cites McNair as allegedly disclosing this feature, and states that it would have been obvious to modify the alleged combination of Horii and Konishi by completely closing the slit, as allegedly taught by McNair, "because the process of complete closing or opening facilitates the dispensing of fluids with controlled mechanical admixtures" (Office action, page 9). Appellants respectfully disagree. As discussed above, it would not have been obvious to completely close the Coanda slit 5 of Horii, because this would prevent the Coanda spiral flow unit from achieving the desired spiral flow.

<u>Claim 21</u>

Claim 21 recites that "the flow cross section of the drive-flow discharge slit is variably adjustable during operation of the Coanda flow amplifier." As discussed above, Horii requires the manual adjustment of the clearance of the Coanda slit 5 to be performed <u>during assembly</u> of the Coanda spiral flow unit. A purpose of Horii is to ensure that the clearance of the Coanda slit 5 is accurately set during assembly. The first unit A, the second unit B, and the outer peripheral tube unit C of the Coanda spiral flow unit of Horii are designed <u>in advance</u> to provide the specified slit clearance with high precision. Therefore, it would not have been obvious to modify Horii to make the flow cross section of the Coanda slit 5 variably adjustable during operation of the Coanda flow amplifier,

because the entire Coanda spiral flow unit is designed to achieve one specific slit clearance that does not change after assembly. Therefore, claim 21 is patentable over Horii, Konishi, and McNair at least by virtue of its dependence on claim 1, as well as its additionally recited features.

D. Claims 3-5 and 10-12 are Not Obvious over Horii, Konishi, and Simon under 35 U.S.C. § 103(a)

Claims 3-5 and 10-12 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Horii, Konishi, and Simon. However, for the following reasons, Appellants submit that the rejection is improper and should be withdrawn.

As discussed above, Horii does not teach or suggest a Coanda flow amplifier that comprises, *inter alia*, "an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio," as recited in claim 1. On the contrary, as discussed above, Horii teaches away from the quoted claim feature. Further, Konishi and Simon fail to remedy the deficient teachings of Horii. Therefore, claims 3-5 and 10-12 are patentable over Horii, Konishi, and Simon at least by virtue of their dependencies on claim 1, as well as their additionally recited features.

E. Claims 6-9 are Not Obvious over Horii, Konishi, Simon, and Davies under 35 U.S.C. § 103(a)

Claims 6-9 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Horii, Konishi, Simon, and Davies. However, for the following reasons, Appellants submit that the rejection is improper and should be withdrawn.

As discussed above, Horii does not teach or suggest a Coanda flow amplifier that comprises, *inter alia*, "an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio," as recited in claim 1. On the contrary, as discussed above, Horii teaches away from the quoted claim feature. Further, Konishi, Simon, and Davies fail to remedy the deficient teachings of Horii. Therefore, claims 6-9 are patentable over Horii, Konishi, Simon, and Davies at least by virtue of their dependencies on claim 1, as well as their additionally recited features.

VIII. CONCLUSION

In view of the foregoing, Appellants respectfully request the reversal of the final rejection of claims 1-12 and 21.

The Appeal Brief is being submitted with the required fee of $540.00. This amount is believed to be correct, however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 05-1323, Docket No. 102063.56904US.

Respectfully submitted,

September 19, 2011

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CLAIMS APPENDIX

1. A Coanda flow amplifier, comprising:

a suction intake;

an outlet;

a fluid channel extending between the suction intake and the outlet;

a drive flow inlet that is in fluid flow communication with the fluid channel via a drive-flow discharge slit; and

an electronic control unit that adjusts the flow cross section of the drive-flow discharge slit after assembly of the Coanda flow amplifier such that a pressure ratio between an output pressure of the drive flow that leaves the drive-flow discharge slit and an intake pressure of the drive flow that enters the drive-flow discharge slit does not exceed a critical pressure ratio.

2. The Coanda flow amplifier according to claim 1, wherein the drive-flow discharge slit can be completely closed.

3. The Coanda flow amplifier according to claim 1, wherein the Coanda flow amplifier comprises a flow-guiding element that is arranged between the suction intake and the outlet, and is axially displaceable along a longitudinal axis of the Coanda flow amplifier.

4. The Coanda flow amplifier according to claim 3, wherein:

the suction intake is arranged in a first housing section; and

the drive-flow discharge slit is formed between a downstream face of the first housing section and an upstream face of the flow-guiding element.

5. The Coanda flow amplifier according to claim 3 wherein at least in an area of the drive-flow discharge slit, the flow-guiding element is surrounded by a chamber that connects the drive-flow inlet with the drive-flow discharge slit.

6. The Coanda flow amplifier according to claim 5, wherein the auxiliary displaceable flow-guiding element carries through to the second housing section and is guided in the second housing section in a sealed manner.

7. The Coanda flow amplifier according to claim 3, wherein:

the outlet is arranged in a third housing section; and

a downstream section of the flow-guiding element protrudes into the third housing section and is guided in the third housing section in a sealed manner.

8. The Coanda flow amplifier according to claim 7, wherein a sealing element seals the flow-guiding element against the third housing section; and

the sealing element is arranged in a groove formed on the third housing section and works together with a circumferential surface of the flow-guiding element.

9. The Coanda flow amplifier according to claim 6, wherein quasi-static sealing elements are provided to seal the flow-guiding element against at least one of the second and third housing sections.

10. The Coanda flow amplifier according to claim 3, wherein an actuating element is provided to effect the axial displacement of the flow-guiding element.

11. The Coanda flow amplifier according to claim 10, wherein the actuating element is a piezo actuator.

12. The Coanda flow amplifier according to claim 10, wherein the flow-guiding element is resiliently pre-loaded in a direction opposite to the fluid-flow direction in the fluid channel to close the drive-flow discharge slit when the actuating element is in its inactive state.

13. A method for operating a Coanda flow amplifier having a suction intake, an outlet, a fluid channel extending between the suction intake and the outlet, and a drive flow inlet that is in fluid flow communication with the fluid channel via a drive-flow discharge slit, wherein the flow cross section of the drive-flow discharge slit is variably adjustable; said method comprising:

feeding a fluid flow that is to be amplified to a suction intake;

feeding a drive-flow to the drive-flow inlet;

adjusting a variable flow cross section of the drive-flow discharge slit such that a pressure ratio between the output pressure of the drive flow when it leaves the drive-flow discharge slit and an intake pressure of the drive flow when it enters the drive-flow discharge slit does not exceed a critical pressure ratio.

14. The method according to claim 13, wherein the variable flow cross section of the drive-flow discharge slit is adjusted so that the pressure ratio between the output pressure of the drive flow when it leaves the drive-flow discharge slit and the intake pressure of the drive flow when it enters the drive-flow discharge slit is equal to the critical pressure ratio.

15. A fuel cell system comprising:

at least one fuel cell;

a fluid source;

a fluid line;

a Coanda flow amplifier arranged in the fluid line, with both a suction intake and an outlet of the Coanda flow amplifier being fluid-connected to the fluid line and a drive-flow inlet of the Coanda flow amplifier being fluid-connected to the fluid source;

wherein the Coanda flow amplifier includes,

a suction intake;

an outlet;

a fluid channel extending between the suction intake and the outlet; and

a drive flow inlet that is in fluid flow communication with the fluid channel via a drive-flow discharge slit;

wherein the flow cross section of the drive-flow discharge slit is variably adjustable.

16. The fuel cell system according to claim 15, wherein the fluid line is a purge-gas feed line that is connected to the fuel cell.

17. The fuel cell system according to claim 15, wherein the fluid line is a cathode gas supply line that is connected to the fuel cell.

18. The fuel cell system according to claim 15, wherein the fluid line is a cold-starting-gas supply line that is connected to a cold-starting component.

19. The fuel cell system according to claim 15, wherein the fluid line is an exhaust-gas recirculation line for the recirculation of fuel cell exhaust gas.

20. The fuel cell system according to claim 19, wherein the exhaust gas recirculation line is an anode-exhaust-gas recirculation line for the recirculation

of anode exhaust gas and the anode gas is supplied to the fuel cell from the fluid source.

21. The Coanda flow amplifier according to claim 1, wherein the flow cross section of the drive-flow discharge slit is variably adjustable during operation of the Coanda flow amplifier.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.